WHAT IS CLAIMED IS:

1. An array comprising a plurality of microchannels for capturing an individual cell therein.

2. The array of claim 1, wherein said microchannels comprise at least a first and a second set of microchannels, said first set having a first cross-sectional area and said second set having a second cross-sectional area, said first cross sectional area being larger than said second cross sectional area, whereby said microchannels form a gradient for capturing said cell.

3. The array of claim 1, wherein said microchannels each have a depth of 0.8 to 6.0 microns, a length of between about 10 microns to about 210 microns, said length including an entry portion for receiving said individual cell and an exit portion that said individual cell may pass through, said entry portion having an entry width of between about 2.5 microns to about 25 microns, and said exit portion having an exit width of between about 0.5 microns to about 7 microns.

4. The array of claim 3, wherein said microchannels are substantially wedge-shaped.

5. The array of claim 3, wherein said length is about 60 microns, said entry width is about 3.7 microns, and said exit width in about 1.5 microns and depth of about 3.4 microns.

6. The array of claim 3, wherein said length is about 35 microns, said entry width is about 3.6 microns, and said exit width is about 1.4 microns.

7. The array of claim 3, wherein said length is about 100 microns, said entry width is about 4.5 microns, and said exit width is about 1.5 microns.

8. The array of claim 3, wherein said length is about 16 microns, said entry width is about 3.6 microns, and said exit width is about 1.4 microns.

9. The array of claim 1, further comprising a plurality of safety channels in communication with said microchannels wherein said safety channels are adapted to prevent said cell from escaping from said microchannels.

10. The array of claim 9, wherein said safety channels have a width of between about 1.5 to about 0.5 microns, and a length of between about 0.5 to about 30 microns.

11. The array of claim 1, wherein said microchannels are adapted to maintain a constant rate of fluid flow therethrough.

12. The array of claim 1, further comprising shunt channels adapted to allow said cell to bypass an occupied region of said microchannels.

13. The array of claim 12, wherein said shunt channels have a length of between about 10 microns to about 100 microns.

14. The array of claim 1, wherein said microchannels have cross-sectional dimensions adapted to temporarily deform a cell passing therethrough.

15. The array of claim 1, further comprising a means for moving said cells through said microchannels.

16. The array of claim 15, wherein said means for moving said cells through said microchannels comprises a vacuum pump for pulling said cell through said microchannels, negative pressure generated by connected water columns, or a peristaltic pump for driving said cell through the channels.

17. The array of claim 1, wherein said microchannels have dimensions on the same scale as human capillaries.

18. An array having a plurality of microchannels for capturing an individual cell therein, said microchannels each have a length including an entry portion for receiving said individual cell and an exit portion that said individual cell may pass through, said entry portion having an entry width, and said exit portion having an exit width, wherein said plurality of microchannels comprises at least one of: a standard set of microchannels having a length of between about 40 to about 100 microns, an entry width of between about 3 to about 9 microns, and an exit width of between about 0.5 to about 2 microns; a wide set of microchannels having a length of between about 40 to about 100 microns, an entry width of between about 3 to about 9 microns, and an exit width of between about 0.5 to about 2 microns; a tight set of microchannels having a length of between about 100 to about 40 microns, an entry width of between about 3 to about 6 microns, and an exit width of between about 0.5 to about 1.5 microns; and a short set of microchannels having a length of between about 10 to about 60 microns, an entry width of between about 6 to about 3 microns, and an exit width of between about 0.5 to about 2 microns.

19. A method for using an array of microchannels for analysis of a cell that comprises the steps of introducing said cell into said array of microchannels; capturing said cell within a single microchannel of said array of microchannels, said single microchannel having known interior dimensions; and calculating said physical characteristics of said cell based on said interior dimensions of said single microchannel.

20. The method of claim 19, wherein said analysis is selected from at least one of. determining the volume of said cell, determining the surface area of said cell, and determining the ratio of cell volume to cell surface area.

21. The method of claim 19, further comprising the step of osmotically swelling said cell prior to introducing said cell into said array.

22. The method of claim 19, further comprising the step of exposing said cell to a labeling dye prior to introducing said cell into said array.

23. The method of claim 22, wherein said labeling dye stains RNA.

24. The method of claim 22, wherein said labeling dye stains a membrane component.

25. The method of claim 24, wherein said membrane component is an asymmetrical membrane lipid polysaccharide.

26. A method for using an array of microchannels for analysis of a cell comprising the steps of introducing said cell into said array of microchannels; passing said cell through a plurality of said microchannels, said microchannels having dimension adapted to temporarily deform said cell; and observing the transit time of said cell through said plurality of microchannels.

27. A process for fabricating an array of microchannels from a substrate, said process comprising the steps of: transferring a pattern onto said substrate; etching said substrate according to said pattern, thereby forming a mold; and molding said array of microchannels from said mold using a suitable material.

28. The process of claim 27, wherein said substrate comprises a silicon based wafer.

29. The process of claim 27, wherein suitable material comprises a silicone rubber or equivalent polymeric substance.

30. The process of claim 27, wherein said array of microchannels comprises at least a first and a second set of microchannels. said first set having a first cross-sectional area and said second set having a second cross-sectional area, said first cross sectional area being larger than said second cross sectional area. whereby said microchannels form a gradient for capturing an individual cell.

31. The process of claim 27, wherein said array of microchannels has individual microchannels each having a length of between about 10 microns to about 100 microns, said length including an entry portion for receiving an individual cell and an exit portion that said individual cell may pass through to a second array whose entry portion would have an entry width of between about 3 microns to about 10 microns, and said exit portion having an exit width of between about 0.5 microns to about 2 microns.

32. The array of claim 31, wherein said individual microchannels are substantially wedge-shaped.

33. The process of claim 31, wherein said length of said individual microchannels is about 60 microns, said entry width of said individual microchannels is about 3.7 microns, and said exit width of said individual microchannels in about 1.5 microns.

34. The process of claim 31, wherein said length of said individual microchannels is about 35 microns, said entry width of said individual

microchannels is about 3.6 microns, and said exit width of said individual microchannels is about 1.4 microns.

35. The process of claim 31, wherein said length of said individual microchannels is about 100 microns, said entry width of said individual microchannels is about 4.5 microns, and said exit width of said individual microchannels is about 1.5 microns.

36. The process of claim 31, wherein said length of said individual microchannels is about 16 microns, said entry width of said individual microchannels is about 3.6 microns, and said exit width of said individual microchannels is about 0.9 microns.

37. The process of claim 27, wherein said array of microchannels comprises a plurality of safety channels in communication with said individual microchannels wherein said safety channels are adapted to prevent said cell from escaping from said individual microchannels.

38. The process of claim 37, wherein said array of microchannels have an exit width of between about 1.5 to about 0.5 microns, and a length of between about 0.5 to about 30 microns.

39. The process of claim 27, wherein said array of microchannels is adapted to maintain a constant rate of fluid flow therethrough.

40. The process of claim 27, wherein said array of microchannels further comprises shunt channels adapted to allow said individual cell to bypass an occupied region or individual channel of said array of microchannels.

41. The process of claim 40, wherein said shunt channels have a length of between about 16 microns to about 100 microns.

42. The process of claim 27, wherein said individual microchannels have cross-sectional dimensions adapted to temporarily deform a cell passing therethrough.

43. The process of claim 27, wherein said microchannels have dimensions on the same scale as human capillaries.

44. The process of claim 27, further comprising joining a first array of microchannels to a second array of microchannels or alternatively etching the silicon wafer in a sequence of entry channels, processing channels and trapping channels to follow.

45. The process of claim 27 further comprising wetting said array of microchannels with a suitable wetting solution.

46. An array produced by the process of claim 26, said array having a plurality of microchannels for capturing an individual cell therein, said microchannels each having a length_including an entry portion with an entry width for receiving said individual cell and an exit portion with an exit width that said individual cell may pass through wherein said plurality of microchannels comprises at least one of: a standard set of microchannels having a length of between about 10 to about 100 microns, an entry width of between about 4 to about 10 microns, and an exit width of between about 3 microns to about 5 microns; a wide set of microchannels having a length of between about 20 to about 40 microns, an entry width of between about 4 to about 10 microns, and an exit width of between about 2 to about 5 microns; a tight set of microchannels having a length of between about 10 to about 50 microns, an entry width of between

about 3 to about 5 microns, and an exit width of between about 2 to about 4 microns; and a short set of microchannels having a length of between about 10 to about 15 microns, an entry width of between about 3 to about 5 microns, and an exit width of between about 2 to about 4 microns.